

WHAT IS CLAIMED IS:

1. An optical cross-connect unit of multigranular architecture (1000, 2000, 3000) comprising:

- a first stage (100) for switching wavelength

5 bands and comprising:

- a switching optical matrix (also known as the first matrix) for switching wavelength bands and having first input ports (also known as switch ports) (1a to 2b) and first output ports (also known as switch ports) (1'a to 2'b) and second input ports (also known as redirection ports) (11 to 22) and second output ports (also known as redirection ports) (11' to 22'),

10 - demultiplexer means (10, 20) for demultiplexing wavelength bands and having p groups of n outputs associated with n distinct wavelength bands, each output being connected to a distinct input switch port of the first matrix,

15 - multiplexer means (10', 20') for multiplexing wavelength bands and having p groups of n inputs each connected to a distinct output switch port of the first matrix,

20 - a second stage (200) for switching wavelengths and comprising:

25 - a switching matrix (also known as second matrix) for switching wavelengths and having first input ports (also known as switch ports) (3a to 4b) and first output ports (also known as switch ports) (3'a to 4'b),

30 - demultiplexer means (30, 60) for demultiplexing wavelengths and each input of which is connected to a distinct output redirection port of the first matrix and each output of which is connected to a distinct input switch port of the second matrix, and

35 - multiplexer means (30', 60') for multiplexing wavelengths and each input of which is connected

to a distinct output switch port of the second matrix and each output of which is connected to a distinct input redirection port of the first matrix,

5 which cross-connect unit is characterized in that the first matrix includes a series of first optical switching submatrices (1, 2) disposed in parallel and the second matrix includes a series of second switching submatrices (3 to 4") disposed in parallel.

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2. A cross-connect unit (1000, 2000, 3000) according to claim 1, characterized in that said first submatrices (1, 2) include n first submatrices, each dedicated to a distinct one of said n wavelength bands and including p of said input switch ports and p of said output switch ports, and at least two of the first submatrices (also known as redirection submatrices), each of which includes at least one distinct input redirection port and at least one distinct output redirection port, and each of which 15 is coupled to a distinct one of said second submatrices (3 to 4").

3. A cross-connect unit (1000, 2000, 3000) according to claim 1, characterized in that each of at least two of 25 the second submatrices (3 to 4") includes at least one inter-input-matrix communications port (41, 42, 4e) and at least one inter-output-matrix communications port (41', 42', 4s), each inter-input-matrix communications port being adapted to receive an information carrier 30 signal from one of said second submatrices and each inter-output-matrix communications port being adapted to deliver an information carrier signal addressed to one of said second submatrices.

35 4. A cross-connect unit (1000, 2000, 3000) according to claim 3, characterized in that it includes intermatrix switching means (5, 5', 5") coupling all of said inter-

input-matrix communications ports to all of said inter-output-matrix communications ports.

5. A cross-connect unit (2000) according to claim 4,
characterized in that the information carrier signals are
optical signals and the cross-connect unit can include an
optical concentrator (6') for concentrating optical
signals coupling all the inter-output-matrix
communications ports to the inputs of the intermatrix
switching means (5') and an optical deconcentrator (7')
for deconcentrating optical signals coupling the outputs
of the intermatrix communications means to all the inter-
input-matrix communications ports.
- 15 6. A cross-connect unit (2000) according to claim 4,
characterized in that the information carrier signals are
optical signals and the intermatrix switching means (5')
can include wavelength conversion means.
- 20 7. A cross-connect unit (1000) according to claim 1,
characterized in that it includes wavelength conversion
means and preferably includes 3R regenerators (81 to 84)
when the information carrier signals are optical digital
signals, said means being disposed between output switch
25 ports of the second submatrices (3, 4) and the wavelength
multiplexer means (40 to 60).
- 30 8. A cross-connect unit (3000) according to claim 1,
characterized in that said second submatrices (3", 4")
are electrical and optical-electrical converters (301 to
402) and electrical-optical converters (303 to 404) are
respectively disposed at least at the level of the input
switch ports and at least at the level of the output
switch ports of said second submatrices.
- 35 9. A cross-connect unit (1000) according to claim 1,
characterized in that it includes an optical concentrator

(6) whose inputs (61 to 64) are connected to a set of output ports (also known as extraction ports) (3'c to 4'd) of said second submatrices and an optical deconcentrator (7) whose outputs (71' to 74') are 5 connected to a set of input ports (also known as insertion ports) (3c to 4d) of said second submatrices.